IN THE CLAIMS:

Please amend claim 4 and add a new claims 15 and 16 as follows:

1. (Original) A rotation drive control device of a three-phase DC motor, in which such currents that a rotor does not responds, are sequentially caused to flow through any two of three phase coils to detect the polarity of a voltage induced in each de-energized phase, thereby to determine the corresponding phase coil through which the current is caused to flow to rotate the rotor, and the direction of energization thereof, whereby the currents are caused to flow according to the determination thereof to rotate the rotor,

   wherein when a detection result of the two phases, of an induced-voltage detection result of the three phases is an expected result, a detection result of the remaining one phase is ignored, and the corresponding phase coil through which the current is caused to flow to rotate the rotor and the direction of energization thereof are determined, whereby the currents are caused to flow according to said determination to rotate the rotor.

2. (Original) The rotation drive control device of three-phase DC motor according to claim 1, wherein the detection of the polarity of a voltage induced in each de-energized phase and the determination of the level of the induced voltage are performed, and the corresponding phase coil through which the current is caused to flow, and the direction of energization thereof are determined based on a polarity detection result of the induced voltage and a level detection result thereof.

3. (Original) The rotation drive control device of three-phase DC motor according to claim 2, further including a comparator or an arithmetic circuit which determines whether the level of the induced voltage is larger or smaller than a predetermined level, and registers which retain the results of determination every phases.

4. (Currently Amended) The rotation drive control device of three-phase DC motor according to claim 2 [[or 3]], further including a decoder which decodes a signal indicative of the polarity detection result and a signal indicative of the level detection result and outputs a signal indicative of each energized phase.

5. (Original) The rotation drive control device of three-phase DC motor according to claim 4, further including a register which stores the output of the decoder, and rotation determining means which compares a signal indicative of the previous energized phase, which is stored in the register, with the present output signal of the decoder to thereby determine normal rotation or reverse rotation of the rotor.

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6. (Original) A method of starting up a three-phase DC motor, wherein such currents that a rotor does not responds, are sequentially caused to flow through any two of three phase coils to detect the polarity of a voltage induced in each de-energized phase, and the level of the induced voltage is determined to decide the corresponding phase coil through which the current is caused to flow to rotate the rotor, and the direction of energization thereof, whereby the currents are caused to flow according to the determination thereof to start up the motor, said method comprising the steps of:

effecting the induced-voltage polarity detection and level determination on the coils for all three phases at the beginning of the start-up to thereby perform determination of the corresponding phase coil through which a current is caused to flow to rotate the rotor, and the direction of energization thereof ato perform energization according to said determination; and

after determination that the rotor is normally rotated, effecting the induced-voltage polarity detection and level determination on the coil for any one of the phases to thereby perform determination of the corresponding phase coil through which a current is caused to flow to rotate the rotor, and the direction of energization thereof, to perform energization according to said determination.

7. (Original) The method according to claim 6, further comprising the steps of:

storing the induced-voltage polarity detection result about the coils for the three phases; and

comparing an induced-voltage polarity detection result about the three-phase coils executed next with the previous detection result to thereby make a decision as to whether the rotor is normally rotated.

8. (Original) The method according to claim 6, further comprising the steps of:

confirming whether the rotor is rotated a predetermined electrical degrees or a predetermined number of times or more; and

thereafter effecting the induced-voltage polarity detection and level determination on any one of the three-phase coils to thereby proceed to determination of the corresponding phase coil through which a current is caused to flow to rotate the rotor, and the direction of energization thereof, and energizing control according to said determination.

9. (Original) A rotation drive control device of a multi-phase DC motor, in which the total current that flows through coils of the multi-phase DC motor is detected and compared with a current command value, a sine wave-shaped current is caused to flow through each coil according to the difference therebetween to thereby rotatably drive the motor,

wherein positive-phase and negative-phase triangular wave information are generated as comparison information for generating PWM control signals which control a driver for causing a drive current to flow through each coil, and the PWM control signal for the corresponding phase coil to which a voltage of an intermediate level is applied by the driver, of the respective phase coils, is generated using triangular wave information opposite in phase to triangular wave information used to generate the PWM control signals for other phase coils.

10. (Original) The rotation drive control device of multi-phase DC motor according to claim 9, wherein the triangular wave information is given by voltage values of triangular signals, and a comparator is provided which compares the triangular signals with command voltage values for the respective phases and thereby generates and outputs PWM control signals for controlling the driver.

11. (Original) The rotation drive control device of multi-phase DC motor according to claim 10, further including: determining means which detects one in which a command voltage value is intermediate, of the respective phases and outputs a signal indicative of the corresponding phase associated with the command voltage value; and selecting means which selects either the positive-phase triangular wave signal or

the negative-phase triangular wave signal in accordance with the signal outputted from the determining means and supplies it to the comparator.

12. (Original) The rotation drive control device of multi-phase DC motor according to claim 9, wherein each of sample-and-hold signals, which provides timing for detecting the total current flowing through each coil, is generated so as to be synchronized with the rising edge or falling edge of the PWM control signal for the phase in which the command voltage value is intermediate, of the respective phases.

13. (Original) The rotation drive control device of multi-phase DC motor according to claim 9, wherein said multi-phase DC motor is a three-phase brushless motor, one of the control signals for the three phases supplied to the driver is set as a signal fixed to a 100% duty, and the PWM control signals for the remaining two phases are generated using triangular wave information placed in an reverse-phase relationship with one another.

14. (Original) The rotation drive control device of multi-phase DC motor according to claim 13, wherein each of sample-and-hold signals, which provides timing for detecting the total current flowing through each coil, is generated so as to be synchronized with each of peak points of the triangular wave information.

15. (New) The rotation drive control device of three-phase DC motor according to claim 3, further including a decoder which decodes a signal indicative of the polarity detection result and a signal indicative of the level detection result and outputs a signal indicative of each energized phase.

16. (New) The rotation drive control device of three-phase DC motor according to claim 15, further including a register which stores the output of the decoder, and rotation determining means which compares a signal indicative of the previous energized phase, which is stored in the register, with the present output signal of the decoder to thereby determine normal rotation or reverse rotation of the rotor.